



Danish fisheries management, fleet structure and economic performance

Andersen, Jesper Levring

Publication date:
2012

Document version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Andersen, J. L., (2012). *Danish fisheries: management, fleet structure and economic performance*, 11 p., Mar 01, 2012. FOI Udredning No. 2012/2

FOI Commissioned Work



Danish fisheries:
Management, fleet structure and
economic performance

Jesper Levring Andersen

(FOI Udredning)
2012 / 2

FOI Commissioned Work 2012 / 2

(FOI Udredning 2012 / 2)

Danish fisheries: Management, fleet structure and economic performance

Forfatter: Jesper Levring Andersen

Prepared according to the agreement on public sector services between the Institute of Food and Resource Economics and the Ministry of Food, Agriculture and Fisheries.

Institute of Food and Resource Economics

University of Copenhagen

Rolighedsvej 25

DK-1958 Frederiksberg

www.foi.life.ku.dk/English



Danish fisheries Management, fleet structure and economic performance

By Associate Professor Jesper Levring Andersen
Institute of Food and Resource Economics
University of Copenhagen
Rolighedsvej 25
1958 Frederiksberg C

Introduction

In the last decade, the Danish management system has, under the CFP, undergone considerable changes, which to a large extent have been undertaken with involvement of stakeholders from the fishing communities. The capacity of the Danish fishing fleet was intensively regulated before the introduction of individual property rights in 2003. The fleet capacity regulations have been strictly enforced and the capacity levels have been well below the EU reference levels for many years. However, problems with overcapacity and poor economic performance due to a regulation of quotas allowing all registered fishermen to enter any fishery managed by rations led to a government decision in 2001 to enter into a management using Transferable Fishing Concessions (TFC).

The Danish TFC management has obtained interest from many parties having an interest in fisheries management. This short note intends to give some basic facts and figures about the development in Danish fisheries from 2000 to 2010.

The Danish Management system

The first step towards a Danish regulatory system primarily based on Transferable Fishing Concessions was initiated for the pelagic and industrial fleets 1st January 2003. Initially herring was regulated by Individual Transferable Quotas (ITQ's), but later also mackerel and a range of industrial species (used to produce fishmeal and fish oil) were regulated by ITQ's. The ITQ's were allocated using the grandfathering method, where the rights were given free of charge to fishermen, using 2000-2002 as reference years.

The pelagic and industrial vessels catch relatively cheap fish and are thus more dependent on efficient handling of large amounts of fish than the demersal fleet.

The fishery for demersal species was regulated by individual fishing rights from 1st January 2007. Individual vessel quota shares (VQS) for the 28 most important quotas were distributed to all vessels with a level of activity generating more than € 30,000 of gross earnings each year in the reference period 2003-2005. Us-

ing the grandfathering method, VQS were allocated to each vessel based on landings in the reference period 2003-2005. Initially the VQS could only be transferred together with the vessel to another vessel, but this restriction was abolished after two years.

A VQS vessel can join a coastal fisheries scheme under the condition that the vessel is less than 17 meters and at least 80% of its fishing trips are shorter than three days. An additional quota share of cod and sole was allocated as a premium for vessels participating in the coastal fisheries scheme. The coastal vessels can buy quota shares from vessels over 17 meters, while vessels above 17 meters cannot buy from the coastal vessels.

The less active – typically small scale vessels with gross earnings below € 30,000 in the reference period continued to be managed with a ration system with a fixed share of the national quotas for their segment. The total quota allocated to the group of less active vessels is calculated as share of these vessels fishery in the reference period (2003-2005).

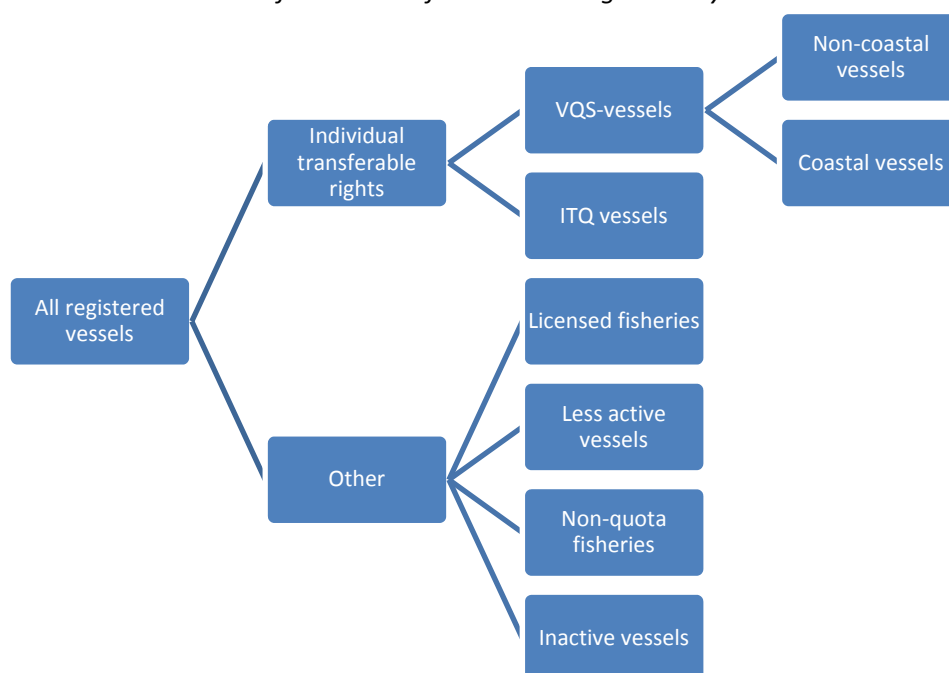
A Fish Fund with flexible quota shares for the individual stocks was also established to support the development in the fishery. Rules with regard to ownership, concentration of rights and requirements for active participation in the fishery were also a part of the regulation.

The Danish management system prioritises high flexibility. Vessels can transfer shares permanently typically in the context of fleet adaptation, but can also lease limited amounts of fish within the quota year typically to address the daily need for quota adaptations. Furthermore, fishermen can form a pool with other vessels within which the annual vessel quotas can be transferred freely, given that the fishermen comply with the requirement of being an active fisherman earning at least 60% of his income from active fishing.

A number of fisheries for mussels and brown shrimp are regulated separately with entry-licenses. Some vessels only catch non-quota species and are accordingly not restricted by EU quotas. Finally, inactive vessels are placed separately. There can be various reasons for vessels to be inactive rather than being scrapped. For example until 2009, in order to be eligible for days at sea in relation to the North Sea cod recovery plan. The days at sea could then be transferred to active vessels.

Based on the above, each vessel in the Danish fishing fleet can be placed in one of the boxes displayed in Figure 1 showing the structure of the Danish management system.

Figure 1 The overall structure of the Danish fisheries management system



The structural development of the Danish fishing fleet

The structural development is influenced by many factors. The three primary factors are: 1) the biological conditions, such as the catchability of fish and quota levels, 2) the economic conditions including fish and fuel prices and the general financial conditions, and 3) the management system in place.

The Danish fishing fleet has been reduced in number of vessels with 32% from 2000 to 2010, cf. Table 1. The development has been most prominent for the active vessels having yearly gross earnings above € 30,000 with a reduction of 52% from 2000 to 2010. The number of less active vessels with yearly gross earnings below € 30,000 consists primarily of vessels below 12 metres, and the number of vessels has been relatively stable over the period. The number of inactive vessels, i.e. vessels not having any fishing activities within a year, has been reduced with 28% from 2000 to 2010.

Table 1 Number of registered vessels in the Danish fishing fleet, 31st December

		2000	2003	2006	2007	2008	2009	2010
Active vessels ¹⁾	<12m	494	406	434	356	324	260	259
	12-15m	359	270	249	198	191	174	172
	15-18m	238	186	155	116	116	118	118
	18-24m	207	177	131	103	100	93	94
	24-40m	155	137	89	61	54	46	45
	>40m	46	43	39	38	30	29	28
	Total	1,499	1,219	1,097	872	815	720	716
Less active vessels ²⁾		1,265	1,440	1,239	1,215	1,174	1,209	1,121
Inactive vessels		1,377	910	798	870	900	902	985
Total number of vessels		4,141	3,569	3,134	2,957	2,889	2,831	2,822

Source: The Danish AgriFish Agency

Note: 1) Yearly gross earnings above € 30,000.

2) Yearly gross earnings below € 30,000.

The active vessels below 24 metres obtain the primary part of their income from catching demersal species. For the active vessels between 24 and 40 metres, their income is more equally distributed between demersal and pelagic species. Finally, the active vessels above 40 metres obtain almost entirely their income from catching pelagic and industrial species, where the latter are used to produce fish meal and fish oil. The income for less active vessels originates on average primarily from demersal species. These catch compositions have been reasonably stable within the last decade.

The development in capacity, measured in tonnage (GT), is shown in Table 2. The registered capacity has been reduced from 111,120 GT in 2000 to 66,000 GT in 2010, equal to 41%. As the reduction is done on a voluntary basis, some of the inactive and potential capacity may be activated if for instance changes in quotas or economy make it economically profitable.

Table 2 Tonnage of registered vessels in the Danish fishing fleet (GT), 31st December

		2000	2003	2006	2007	2008	2009	2010
Active vessels ¹⁾	<12m	3,671	3,044	3,196	2,730	2,533	2,140	2,178
	12-15m	7,421	5,425	4,921	3,968	3,829	3,514	3,490
	15-18m	10,395	8,068	6,497	4,918	5,257	5,643	5,664
	18-24m	17,957	15,334	10,625	8,563	8,481	8,411	8,875
	24-40m	36,685	33,966	21,707	15,331	13,618	12,042	11,968
	>40m	28,272	27,061	29,674	29,934	24,438	26,798	26,714
	Total	104,400	92,897	76,620	65,444	58,155	58,547	58,888
Less active vessels ²⁾		4,404	4,332	3,525	3,911	3,241	4,164	3,860
Inactive vessels		2,316	1,536	5,577	7,114	11,628	5,038	3,252
Total for registered vessels		111,120	98,765	85,722	76,469	73,024	67,749	66,000
Unutilized tonnage that can be inserted				4,941	7,977	11,671	20,268	21,618
Total tonnage		111,120	98,765	90,663	84,446	84,695	88,017	87,618

Source: The Danish AgriFish Agency.

Note: 1) Yearly gross earnings above € 30,000.

2) Yearly gross earnings below € 30,000.

For the active vessels, the average tonnage per vessel has increased from 70 GT in 2000 to 81 GT in 2010. For the vessels below 15 metres, the increase has been modest, but for the vessels above 15 metres, the increase has been more pronounced, especially for those above 40 metres, which on average has gone from 615 GT in 2000 to 954 GT in 2010. The corresponding yearly average change in vessel number and tonnage for the period prior to and after the introduction of the vessel quota shares on 1st January 2007 is given in Table 3.

Table 3 Average yearly change in vessel numbers and tonnage (%)

		Number of vessels		Tonnage	
		Change 2000-2006	Change 2006-2010	Change 2000-2006	Change 2006-2010
Active vessels ¹⁾	<12m	-2.0	-10.0	-2.2	-8.0
	12-15m	-5.2	-7.8	-5.7	-7.3
	15-18m	-5.8	-6.0	-6.2	-3.3
	18-24m	-6.2	-7.0	-6.8	-4.0
	24-40m	-7.2	-12.3	-6.8	-11.3
	>40m	-2.5	-7.0	0.8	-2.5
	Total	-4.5	-8.8	-4.5	-5.8
Less active vessels ²⁾		-0.3	-2.5	-3.3	2.5
Inactive vessels		-7.0	5.8	23.5	-10.5
Total number of vessels		-4.0	-2.5	-3.8	-5.8

Note: 1) Yearly gross earnings above € 30,000.

2) Yearly gross earnings below € 30,000.

The average age of a vessel in the Danish fishing fleet is displayed in Table 4. For the active vessels, the age has been stable around 30 years in the period from 2000 to 2010. For the less active vessels and inactive vessels, the average age has gone up.

Table 4 Average age of the registered vessels in the Danish fishing fleet, 31st December

	2000	2003	2006	2007	2008	2009	2010
Active vessels ¹⁾	30	30	31	30	30	30	30
Less active vessels ²⁾	25	25	26	27	27	27	28
Inactive vessels	24	26	29	29	30	31	32
Average age	27	27	28	28	29	29	30

Source: The Danish AgriFish Agency.

Note: 1) Yearly gross earnings above € 30,000.

2) Yearly gross earnings below € 30,000.

The average tonnage age, calculated for each year at their individual vessel tonnage times vessel age divided with total tonnage, to a higher extend gives a weighted measure, which includes the renewal process that has been initiated, especially for the larger vessels. The average tonnage age is shown in Table 5, and it is observed that the average tonnage age for the active vessels have been reduced from 26 in 2000 to 24 in 2006 and then further reduced to 21 in 2010.

Table 5 Average tonnage age of the registered vessels in the Danish fishing fleet, 31st December

	2000	2003	2006	2007	2008	2009	2010
Active vessels ¹⁾	26	26	24	23	24	21	21
Less active vessels ²⁾	29	30	32	31	31	32	32
Inactive vessels	33	31	18	24	21	27	29
Average tonnage age	27	27	24	24	23	23	24

Note: 1) Yearly gross earnings above € 30,000.

2) Yearly gross earnings below € 30,000.

Developments in landings

The total landings in live weight from vessels being active at the end of the year have been reduced from 1.5 million tons in 2000 to 0.8 million tons in 2010, cf. Table 6. In absolute figures, this was primarily due to reduced pelagic landings, but in relative figures the demersal landings have been reduced more.

Table 6 Landings in live weight by Danish fishing vessels active 31st December (1,000 tons)

			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pelagic ^{c3)}	Active vessels ¹⁾	<12m	3	1	2	3	5	5	5	3	2	2	1
		12-15m	16	23	14	15	19	29	21	15	12	13	19
		15-18m	42	55	35	34	43	39	27	18	16	25	29
		18-24m	71	85	85	48	57	55	45	31	28	33	39
		24-40m	666	628	580	352	307	210	178	101	110	101	72
		>40m	496	440	478	369	406	387	413	339	368	439	516
		Total	1,295	1,232	1,195	819	837	724	689	507	535	613	676
	Less active vessels ²⁾		1	0	0	0	0	1	0	0	0	0	0
	Total Pelagic		1,295	1,233	1,195	819	837	725	690	507	535	614	676
Demersal ³⁾	Active vessels ¹⁾	<12m	64	61	55	52	51	37	29	28	25	25	18
		12-15m	60	61	53	48	50	36	27	25	26	24	20
		15-18m	46	53	47	37	40	37	38	38	22	22	24
		18-24m	32	32	30	28	26	22	22	18	19	19	20
		24-40m	27	27	30	27	35	36	24	16	19	20	20
		>40m	4	4	4	4	6	6	7	7	6	7	7
		Total	233	238	220	196	208	174	146	132	117	117	109
	Less active vessels ²⁾		4	4	4	4	3	3	3	3	3	3	3
Total Demersal		237	242	224	200	212	177	149	135	119	120	112	
Total live weight			1,532	1,475	1,419	1,020	1,048	903	839	642	654	734	788

Source: The Danish AgriFish Agency

Note: 1) Yearly gross earnings above € 30,000.

2) Yearly gross earnings below € 30,000.

3) Includes all pelagic/demersal species, not only the TCF managed.

The value of landings has not developed in the same direction as the live weight landings. The total landing value has decreased from € 437 million in 2000 to € 390 million in 2010, cf. Table 7. This lower reduction in value compared to live weight can either be due to an increased price of the landed fish and/or a change in the distribution of the landed fish towards more valuable fish.

Table 7 Landings in value by Danish fishing vessels active 31st December (€ million)

			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
P e l a g i c	Active ves- sels ¹⁾	<12m	1	0	1	1	1	1	1	1	1	1	0
		12-15m	2	3	2	2	2	4	4	3	2	2	4
		15-18m	4	7	5	5	5	5	5	4	3	4	7
		18-24m	7	9	12	6	6	6	8	5	4	4	9
		24-40m	62	74	85	46	32	25	31	18	16	13	17
		>40m	66	82	102	69	77	103	114	93	96	89	162
		Total	141	175	206	128	124	144	162	124	121	113	200
	Less active vessels ²⁾		0	0	0	0	0	0	0	0	0	0	0
Total Pelagic		141	175	206	128	124	144	163	124	122	113	200	
D e m e r s a l	Active ves- sels ¹⁾	<12m	41	40	35	33	32	33	35	34	26	19	19
		12-15m	55	56	48	38	37	39	40	37	32	24	25
		15-18m	57	56	52	41	36	41	43	40	36	29	35
		18-24m	68	72	71	59	52	55	54	52	49	39	46
		24-40m	54	52	56	47	46	54	57	45	44	40	45
		>40m	12	13	10	10	12	11	13	14	12	13	14
		Total	288	290	272	228	215	232	242	222	198	164	184
	Less active vessels ²⁾		8	9	8	9	8	8	8	8	7	7	6
Total Demersal		296	299	280	237	223	240	250	229	205	170	190	
Total value			437	473	487	365	347	384	413	353	327	283	390

Source: The Danish AgriFish Agency

Note: 1) Yearly gross earnings above € 30,000.

2) Yearly gross earnings below € 30,000.

Economic performance

A range of economic performance measures can be used in order to analyse the economic situation for the Danish fishing fleet. In Table 8, the earning capability and gross profit are used.

The earning capability is defined as gross income, covering income from fishing activities as well as other types of income, minus operating costs for fuel, provisions, brokerage, packing, maintenance, insurance etc., and it portrays the surplus available for payment of crew and capital.

The earning capability is regarded as the best indicator of the economic development of small vessels below 12 metres, because labour costs can be overestimated due to the special crew structure with an owner and possible support of a part time fisherman. An average active vessel below 12 metres has had a relatively stable earning capability from 2000 to 2009, cf. Table 8.

For the vessels above 12 metres, gross profit is considered to be a better economic performance measure. The gross profit is defined as the earning capability minus labour costs, and thus gives the surplus to pay off the invested capital. A general observation on the economic performance of an average vessel within the various length groups above 12 metres indicates that gross profit rise to a higher level from 2006/2007 and onwards.

Table 8 Key economic indicators for an average active vessel (€ 1,000)

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<12 m	Gross income	71	74	75	79	67	75	81	93	88	74
	Operating costs	28	28	29	31	29	33	33	40	44	40
	Earning capability	43	46	45	48	38	43	48	53	44	35
	Labour costs	55	53	52	55	48	46	50	53	55	50
	Gross profit	-12	-7	-7	-7	-11	-3	-3	0	-12	-15
12-15 m	Gross income	152	158	150	147	134	157	184	206	200	159
	Operating costs	62	61	59	61	58	68	77	88	94	82
	Earning capability	90	98	90	86	76	89	107	118	107	78
	Labour costs	86	90	84	87	77	82	87	84	87	76
	Gross profit	4	7	7	-1	-1	7	20	35	20	2
15-18 m	Gross income	271	267	260	230	231	270	315	370	329	299
	Operating costs	109	103	101	99	104	110	121	146	148	137
	Earning capability	163	164	159	131	126	160	194	224	181	162
	Labour costs	137	135	129	122	124	134	145	161	143	131
	Gross profit	26	29	30	9	2	26	48	63	38	31
18-24 m	Gross income	375	374	408	393	335	395	487	584	593	495
	Operating costs	159	148	154	167	162	179	208	230	275	224
	Earning capability	216	226	255	226	173	216	279	353	318	271
	Labour costs	180	171	188	191	155	180	202	223	217	198
	Gross profit	36	55	66	35	17	36	77	130	101	73
24-40 m	Gross income	818	919	1,023	739	679	799	1,111	1,106	1,200	1,188
	Operating costs	432	425	422	395	392	446	538	553	648	572
	Earning capability	386	494	600	343	288	353	573	553	552	617
	Labour costs	273	317	350	259	244	274	340	325	368	375
	Gross profit	114	177	251	84	43	79	234	228	184	242
>40 m	Gross income	1,447	1,915	2,391	1,667	1,816	2,757	3,222	2,622	3,605	3,259
	Operating costs	726	752	798	771	844	1,005	1,095	934	1,249	1,111
	Earning capability	720	1,163	1,593	897	973	1,752	2,127	1,688	2,357	2,148
	Labour costs	419	560	699	480	519	673	762	619	767	753
	Gross profit	301	603	894	417	454	1,079	1,366	1,068	1,590	1,395

Source: The Danish Fishery Account Statistics, Statistics Denmark.

Note: Includes only active vessels with a value of landings above a yearly threshold.

Investments

The average yearly investments in fishery assets such as vessel, hull, engines, winches, electronics, fishing gear etc. are shown in Table 9. Comparing the period before 2006 with the period after, a shift is generally observed towards a higher level of investments. For the vessels above 40 metres, this shift becomes evident already from 2004.

Table 9 Investments in fishery assets for an average active vessel (€ 1,000)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<12m	10	10	9	11	7	11	9	6	20	14
12-15m	19	15	19	13	15	9	60	36	43	7
15-18m	26	14	2	35	22	17	40	144	161	46
18-24m	60	54	43	69	11	21	66	119	138	187
24-40m	182	141	118	73	64	54	232	432	60	407
>40m	520	214	356	892	2,122	2,317	2,403	1,972	1,906	775

Source: The Danish Fishery Account Statistics, Statistics Denmark.

Note: Includes only active vessels with a value of landings above a yearly threshold.

Distribution of fishing rights

The transferability of fishing rights became possible from 2003 for pelagic and from 2007 for demersal species. The transferability is possible at two levels: 1) as a permanent transfer of quota shares between vessels, or 2) as an in-year transfer (lease) of vessel quotas between vessels.

The development in transfers of shares illustrates the longer term development in the fleet, and the development in the allocation of these is shown in Table 10. The demersal species are primarily caught by vessels below 40 metres, while the pelagic species are caught by the vessels above 40 metres. Inactive vessels also have some shares, which are leased to other vessels typically within pools. Inactive vessels also have transferable quota shares. These are not transferred to other vessels due to various legal restrictions on transfer possibilities to avoid concentration as well as restrictions related to primarily the North Sea cod recovery plan. However, these inactive vessels must be owned by active fishermen. The vessels quotas allocated to these inactive vessels are transferred to other vessels, which land the fish.

Table 10 Relative distribution of transferable quota shares (%), 31st December

		Demersal species					Pelagic species				
		1/1- 2007	2007	2008	2009	2010	1/1- 2007	2007	2008	2009	2010
Active vessels ¹⁾	<12m	11	10	8	7	7	1	2	1	0	0
	12-15m	15	12	12	11	11	6	4	2	3	3
	15-18m	16	12	12	13	14	15	12	7	6	6
	18-24m	19	17	17	19	20	8	7	6	5	5
	24-40m	29	26	27	27	30	16	14	11	8	8
	>40m	1	2	1	1	1	49	54	62	68	70
	Total	91	79	77	79	82	96	93	89	90	93
Less active vessels ²⁾		2	4	3	5	6	1	3	1	2	2
Inactive vessels		7	17	20	15	12	4	4	10	8	5

Source: The Danish AgriFish Agency.

Note: 1) Yearly gross earnings above € 30,000.

2) Yearly gross earnings below € 30,000.

Table 10 shows the overall development in the allocation of vessel quota shares. As fishing vessels can swap and lease fish to other vessels, the distribution of quota share is not straight forward comparable with the distribution of live weight landings in Table 6. This discrepancy is furthermore enhanced by the possibility of being member of a pool. Table 11 shows how many vessels are actually a member of a pool. Approximately two-thirds of the active vessels were members in 2010. The pools have been attractive for the fish-

ermen to join, because it increases their flexibility. The two largest pools had more than 250 members each in 2010.

Table 11 Number of vessels being member of a pool, 31st December

		1/1-2007	2007	2008	2009	2010
Active vessels ¹⁾	<12m	142	123	135	129	135
	12-15m	143	125	130	136	136
	15-18m	114	89	88	94	94
	18-24m	98	87	83	80	82
	24-40m	84	71	52	45	42
	>40m	39	41	22	22	21
	Total	620	536	510	506	510
Less active vessels ²⁾		32	51	51	107	102
Inactive vessels		22	79	105	107	93
Total number of vessels		674	666	666	720	705

Source: The Danish AgriFish Agency.

Note: 1) Yearly gross earnings above € 30,000.

2) Yearly gross earnings below € 30,000.

Table 12 shows that around 80% of the quota shares are now related to vessels in a pool. There is no obligation to register in-year quota transfers taking place within a pool in the public databases. However, based on information from pool administrators, there is a considerable amount of transfers within the pools, thus giving rise to improved profitability and possibly reduced discards of the vessels.

Table 12 Distribution of quota shares between vessels in and not in a pool, 31st December

	1/1-2007	2007	2008	2009	2010
In pools	66	81	80	80	80
Not in pools	34	19	20	20	20

Source: The Danish AgriFish Agency.

The coastal fisheries scheme

The number of vessels classified as a coastal vessel and thus a part of the coastal fisheries scheme is shown in Table 13. Vessels joining the scheme are obliged to participate for three years. Thus the sudden reduction in the total number of coastal vessels observed from 2009 to 2010 was due to a new application process. However, the share of coastal vessels out of the total fleet has been stable around 10-11%, when comparing the total number of vessels in Table 1 and Table 12. The share of active coastal vessels out of the total number of active vessels has on the other hand been reduced a bit from 35% in 2007 to 30% in 2010.

Table 13 Number of vessels participating in the coastal fisheries scheme, 31st December

		2007	2008	2009	2010
Active vessels ¹⁾	<12m	187	163	131	114
	12-15m	95	91	83	77
	15-18m	21	23	23	25
	Total	303	277	237	216
Less active vessels ²⁾		38	55	82	57
Inactive vessels		11	13	27	18
Total number of vessels		352	345	346	291

Source: The Danish AgriFish Agency.

Note: 1) Yearly gross earnings above € 30,000.

2) Yearly gross earnings below € 30,000.

The vessels participating in the coastal fisheries scheme have at the overall level had a more or less unchanged share of the vessel quota shares of demersal species and doubled their share of pelagic species, but from a low level, cf. Table 14.

Table 14 Distribution of quota shares between vessels participating in the coastal fisheries scheme and not, 31st December

	Demersal				Pelagic			
	2007	2008	2009	2010	2007	2008	2009	2010
Coastal vessels	18	18	19	17	2	2	3	4
Non-coastal vessels	82	82	81	83	98	98	97	96

Source: The Danish AgriFish Agency.